



Oxford Cambridge and RSA Examinations
General Certificate of Secondary Education

MATHEMATICS B

J567/03

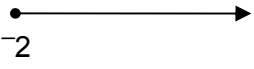
Paper 3 (Higher Tier)

Specimen Mark Scheme

The maximum mark for this Paper is **100**.

| | | | |
|---|---|--------|--|
| 1 | (a) Correct rotation to triangle with vertices $(1, -2)$, $(4, -2)$, $(1, -4)$ | 3 | B2 for rotation 90° anticlockwise about origin OR B1 for rotation 90° clockwise about incorrect centre |
| | (b) Translation $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$ | 1 1 | Accept "2 right 1 up" |
| 2 | (a) 3 and -1 | 1 | Both correct |
| | (b) Points correctly plotted Ruled line through $(0, 7)$ and $(4, -1)$ | 1 1 | ft <i>their</i> (a) Correct line only |
| | (c) 3·4 - 3·6 | 1 | |

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| <p>3*</p> | <p>Complete correct calculation to find $18\frac{3}{8}$ pints required, and rounds up to 20. Indicates with correct and clear language that as the bottles have the same unit cost it does not matter which combination is chosen, and gives at least one combination for 20 pints.</p> <p>Correct method but incomplete or containing a minor error - but if followed without errors, would lead to $\frac{147}{8}$ or $18\frac{3}{8}$. Provides a brief comment saying that it does not matter which combination is chosen but without a clear reason. Gives a combination for <i>their</i> answer.</p> <p>Correctly converts both mixed numbers to improper fractions, or correctly multiplies one of the mixed numbers by 7 and attempts to multiply the result by the other fraction. Weak comment concerning the price of the bottles.</p> <p>No relevant calculations or comments.</p> | <p>6-5</p> <p>4-3</p> <p>2-1</p> <p>0</p> | <p>For the lower mark, there may be one minor slip in the arithmetic at any stage, or weaker explanation.</p> <p><u>Examples of combinations:</u></p> <p>6, 6, 6, 2 6, 6, 4, 4 6, 6, 2, 2, 2, 2 6, 4, 4, 4, 2 6, 4, 4, 2, 2, 2 6, 2, 2, 2, 2, 2, 2, 2 4, 4, 2, 2, 2, 2, 2, 2 2, 2, 2, 2, 2, 2, 2, 2, 2, 2</p> <p><u>Example of working:</u></p> $1\frac{1}{2} = \frac{3}{2} \text{ and } 1\frac{3}{4} = \frac{7}{4}$ $\frac{3}{2} \times \frac{7}{4} = \frac{21}{8}$ $\frac{21}{8} \times 7 \text{ (days)} = \frac{147}{8}$ $18\frac{3}{8}$ <p>For the lower mark, more than one error is present in the working, or comment is missing or has several errors in spelling, punctuation and grammar, or no combination for <i>their</i> answer.</p> <p>For the lower mark, as 2 but with errors in the conversion or in the multiplication, or limited comment which may have poor spelling, punctuation and grammar.</p> |
|------------------|--|---|--|

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|---|---|------------|--|
| 4 | (a)(i) $h = \frac{P+5}{3}$ oe | 2 | M1 $h = \frac{P-5}{3}$ or $h = \frac{P}{3} - 5$ |
| | (ii) $h = \frac{T}{2} - w$ oe | 2 | M1 $h = \frac{T-w}{2}$ or $h = \frac{T}{2} + w$ oe |
| | (b) $x \geq -2$ and  | 3 | M2 $x \geq -2$ without correct diagram OR M1 $6x - 2x \geq -8$ or better B1 ft <i>their</i> inequality correctly represented on the number line |
| 5 | (a) $\frac{20 \times 4}{0.5} = 160$ | 2 | M1 Two of the three numbers correctly rounded to 1sf |
| | (b) Roughly 20×10^{22} | 1 | Condone 16×10^{22} |
| 6 | (a) 0.55 | 1 | |
| | (b) 0.2 | 2 | M1 for $1 - (0.25 + 0.15 + 0.4)$ |
| 7 | (a) She is [extremely] unlikely to get the same result [because of a large number of combinations] | 1 | Accept any correct statement including 'she will not get the same results' |
| | (b) Not very close together, or not close to 0.2, or '2' occurs twice more than '1' Too few trials to be sure, or she needs to do more trials oe | 1 1 | Accept any correct statement Accept any correct statement 'More numbered balls' is not enough |
| 8 | (a) 108° | 2 | M1 $180^\circ - (360^\circ \div 5)$ Accept any correct method |
| | (b) 108° does not divide exactly into 360° | 1 | Allow any equivalent correct statement |
| 9 | (a) All terms will be odd | 1 | Accept any valid statement |
| | (b) $6n + 1$ | 2 | M1 $6n$ seen |

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| 10 | (a) $2 \times 2 \times 2 \times 5$ or $2^3 (\times) 5$ | 2 | M1 for attempt at factor tree/ladder or correct factor pair or better seen Or SC1 for 2, 2, 2, 5 identified but not as product |
| | (b)(i) 8 cao | 2 | B1 for $2 \times 2 \times 2$ oe or answer of 2 or 4 |
| | (ii) 120 cao | 2 | B1 for $2 \times 2 \times 2 \times 3 \times 5$ oe or a multiple of 120 Or M1 for listing multiples of 24 AND 40 <u>After 0,0 in (b)</u> Award SC2 in (b)(ii) for reversed answers |
| 11 | (a) 8640×0.15 (oe) or 1296 8640 – ‘their 1296’ 7344 | M1 M1 A1 | M1 1 – 0.15 or 0.85 M1 8640×0.85 |
| | (b) Yes, as it is [just] over 15 with correct working Or No, it is over 15 with correct working | 3 | M1 Attempt to find 15% of 12800, eg 1280 and attempt to halve B1 1920 seen B1 $2000 > 1920$ and conclusion After 0, SC1 for figs 192 seen Accept any equivalent method. |
| 12 | $a = 280^\circ$ $b = 100^\circ$ | 1 2 | M1 $\angle PQO = \angle PRO = 90^\circ$ A1 ft $360^\circ - (90^\circ + 90^\circ + 80^\circ)$, or $360^\circ - (90^\circ + 90^\circ) + (360^\circ - \text{their } a)$ |
| 13 | (a) Tree diagram complete | 2 | M1 first or second set correct entries |
| | (b) 0.42 | 2 | M1 0.7×0.6 or ft <i>their</i> tree diagram |
| 14 | <u>Finding PR:</u> $8 : 24$ oe seen or used $13 \times \frac{24}{8}$ <u>Finding BC:</u> $54 \times \frac{8}{24}$ <u>Showing information:</u> 45° given as missing angle PR = 39 BC = 18 Complete list of required information, or completed labelled sketch, or missing information completed on given diagrams | B1 M1 M1 B1 A1 A1 B1 | Dependent on first M1 earned Dependent on second M1 earned |

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| 15 | (a) Not enough information – oldest woman could be anywhere in the 50 to 99/100 interval | 1 | Do not accept “she was 100” oe |
| | (b) True - about 12 half squares so 120 000 women | 2 | M1 allow for True with inadequate (but not wrong) justification |
| | (c) False - for age 50 to 100, women about 20 000, men 29 000 | 2 | M1 for true or false and 16 to 25, women about 40 000, men 21 000 seen |
| 16 | $y = -2x + 8$ | 3 | M2 $-2x$ OR M1 for $\frac{6}{2}$ or $(m) = 2$ AND W1 for +8 in equation |
| 17 | Graph translated right (-5, 0) marked (-1, 0) marked | 1 1 1 | SC2 for graph translated left and (-5, 0) and (1, 0) shown or SC1 for graph translated left and either (-5, 0) or (1, 0) shown |
| 18 | 11 www | 4 | M3 $5x = 60 - 7 + 2$ OR M2 $3x + 7 + 2(x - 1) = 4 \times 15$ OR M1 Multiplication by 4 or 8 |
| 19 | 8 | 2 | M1 $\frac{40}{1000} \times 200$ oe |
| 20 | $x = 7, y = -1$ | 3 | M2 $\frac{a^7}{b}$ OR M1 their $\frac{a^2}{b} \times a^7$ evaluated, or $\frac{a^2}{b}$ |
| 21 | (a)(i) $-2a + 2b$ | 1 | |
| | (ii) $b - a$ | 1 | |
| | (b) QS parallel to MN and double the length because $QS = 2(b - a) = 2MN$ | 2 | M1 QS parallel to MN and double the length, or for one statement with $QS = 2(b - a)$ |
| 22 | (a) $(x + 5)^2 - 37$ | 3 | M2 $x^2 + 5x + 5x + 25$ OR M1 $(x + 5)^2$ seen |
| | (b) $\frac{x - 5}{2}$ | 3 | M1 $(x - 5)(x + 5)$ AND M1 $2(x + 5)$ |

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| 23 | <p>(a) Slant height of cone = 4</p> <p>Arc length = $4 \times 2\pi \times \frac{1}{4}$ [= 2π]</p> <p>Radius of cone = 1 (from $\frac{2\pi}{2\pi}$)</p> <p>Use of Pythagoras' theorem</p> <p>$h = \sqrt{15}$</p> | <p>B1</p> <p>M1</p> <p>B1</p> <p>M1</p> <p>A1</p> | <p>Accept $l = 4$</p> <p>$h^2 + 1^2 = 4^2$ or better</p> |
| | <p>(b) Scale factor 2</p> <p>$2\sqrt{15}$ cao</p> | <p>M1</p> <p>A1</p> | |

Paper Total: 100 marks

Assessment Objectives and Functional Elements Grid

GCSE MATHEMATICS B

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Mathematics B Paper 3 (Higher Tier)

| | Topic | Context | Ref | AO1 | AO2 | AO3 | Functional |
|----|--|---------------------|---------------|-----------|-----------|-----------|------------|
| 1 | Transformations | | HIG6 | 5 | | | |
| 2 | Draw straight-line graph | | HIA4 | 4 | | | |
| 3 | Calculations with mixed numbers | Milk | HBN2 | | | 6 | 6 |
| 4 | Change subject of formulae; solve inequality | | HBA2 HBA3 | 7 | | | |
| 5 | Estimate answer to calculation | | HBN5 HSN3 | 3 | | | |
| 6 | Mutually exclusive probability | Counters | HIS1 | | 3 | | |
| 7 | Relative frequency | Lottery machine | HBS1 | | 3 | | |
| 8 | Angle in pentagon; tessellating | | HBG3 | 3 | | | |
| 9 | Sequence | | HBA1 | 3 | | | |
| 10 | Prime factors, HCF, LCM | | HBN6 | 6 | | | |
| 11 | Percentages | Selling cars | HBN4 | | 6 | | 3 |
| 12 | Geometrical calculation | | HSG1 | 3 | | | |
| 13 | Probability with tree diagram | Traffic lights | HSS1 | | 4 | | 2 |
| 14 | Similar triangles | Company logo | HSG5 | | 7 | | 7 |
| 15 | Interpreting table and histogram | Marriage statistics | HGS2 HGS3 | | 5 | | 5 |
| 16 | Find equation of line | | HSA7 | 3 | | | |
| 17 | Transforming graph | | HGA6 | 3 | | | |
| 18 | Algebraic fraction equation | | HSA1 | 4 | | | |
| 19 | Stratified sampling | School | HGS4 | | 2 | | 2 |
| 20 | Laws of indices | | HGN1 | 3 | | | |
| 21 | Vectors | Parallelogram | HGG5 | 2 | | 2 | |
| 22 | Completing the square; simplifying | | HGA2, HSA2 | 6 | | | |
| 23 | Mensuration of sectors and cones | | HGG4 | | | 7 | |
| | TOTAL | | | 55 | 30 | 15 | 25 |

Paper Total: 100 marks